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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/708,199

02/16/2004

Chien-Sheng Yang

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04/19/2005

NORTH AMERICA INTERNATIONAL PATENT OFFICE (NAIPC)

P.O. BOX 506

MERRIFIELD, VA 22116

EXAMINER

DOAN, THERESA T

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 04/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/708,199

Applicant(s)

YANG, CHIEN-SHENG

Examiner

Theresa T. Doan

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 10 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Habermehl et al. (U.S Pat. 6,174,820).

Regarding claim 10, Habermehl (figure 4) discloses a capacitive semiconductor pressure sensor comprising:

an insulating substrate 12 (column 6, lines 27-28);

a conductive movable diaphragm 110 ( see figure 4, column 13, lines 35-36);

a supporter positioned on the insulating substrate 12 for fixing two ends of the diaphragm and forming a sealed cavity 68 between the diaphragm 110 and the insulating substrate 12 (column 16, lines 28-40);

a stationary electrode 112 positioned on the insulating substrate 12 and below the diaphragm 110 (column 13, lines 35-37); and

a control circuit 54 electrically connected to the diaphragm 110 and the stationary electrode 112 (column 13, lines 35-42).

Regarding claim 13, Habermehl (figures 5g-5i) discloses the supporter comprises polysilicon (column 13, lines 19-28).

Regarding claims 14-15, Habermehl (figures 5g-5i) discloses the diaphragm 110 comprises a doped polysilicon (column 13, lines 25-36).

3. Claims 10 and 14-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Scheiter et al. (U.S Pat. 6,140,689).

Regarding claims 10 and 15, Scheiter (figure 2) discloses a capacitive semiconductor pressure sensor comprising:

- an insulating substrate 2 (column 2, lines 50-53);

- a conductive movable diaphragm 7 ( see figure 2, column 2, lines 58-60);

- a supporter 4 positioned on the insulating substrate 2 for fixing two ends of the diaphragm and forming a sealed cavity 6 between the diaphragm 7 and the insulating substrate 2 (column 2, lines 55-63 and column 4, lines 53-60);

- a stationary electrode 8 positioned on the insulating substrate 2 and below the diaphragm 7 (column 3, lines 3-15); and

- a control circuit 11 electrically connected to the diaphragm 7 and the stationary electrode 8 (column 3, lines 26-32).

Regarding claim 14, Scheiter (figure 2) discloses the diaphragm 7 comprises a doped polysilicon (column 3, lines 3-5).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Habermehl et al. (U.S Pat. 6,174,820) in view of Shrauger (U.S 2003/0020094).

Habermehl does not disclose the control circuit being electrically connected to the stationary electrode and the diaphragm via the flexible printed circuit board. However, Shrauger (figure 4) teaches the forming of a plurality electronic components (MEMs) on printed circuit board and being electrically connected to each other. Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the control circuit being electrically connected to the stationary electrode and the diaphragm via the flexible printed circuit board in Habermehl's device because as taught by Shrauger, such connection arrangements are well known and commonly used for providing the electrical connections between the electronic components.

6. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scheiter et al. (U.S Pat. 6,140,689) in view of Shrauger (U.S 2003/0020094).

Scheiter does not disclose the control circuit being electrically connected to the stationary electrode and the diaphragm via the flexible printed circuit board. However, Shrauger (figure 4) teaches the forming of a plurality electronic components (MEMs) on printed circuit board and being electrically connected to each other. Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the control circuit being electrically connected to the stationary electrode and the diaphragm via the flexible printed circuit board in Scheiter's device because as taught by Shrauger, such connection arrangements are well known and commonly used for providing the electrical connections between the electronic components.

7. Claims 1, 3, 5-15, 17, 19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (U.S Pat. 6,472,962) in view of Habermehl et al. (U.S Pat. 6,174,820), and further in view of Bhattacharyya (U.S Pat. 6,845,034).

Regarding claims 1, 8-10, 13-15 and 22, Guo (figures 4-5) discloses a capacitive semiconductor pressure sensor comprising:

a non-single-crystal-silicon-based substrate 80 (dielectric material) (column 5, lines 66-67); a conductive movable metal diaphragm 122 (see figure 5, column 6, lines 36-39); a metal supporter 118 positioned on the non-single-crystal-silicon-based substrate 80 for fixing two ends of the metal diaphragm 122 (column 7, lines 13-14) and forming a sealed cavity 123 (column 6, lines 47-50) between the metal diaphragm 122 and the non-single-crystal-silicon-based substrate 80; a stationary electrode 100

(column 6, lines 64-67) positioned on the non-single-crystal-silicon-based substrate 80 and below the metal diaphragm 122, the stationary electrode 100 and the metal diaphragm 122 constituting a plate capacitor (see figure 5, column 6, lines 30-33).

Guo discloses the conductive movable diaphragm and the supporter made of metal, but Guo does not teach a conductive movable diaphragm and a supporter which are made of polysilicon. However, Habermehl (figure 4) discloses that a conductive movable diaphragm 110 and a supporter are made of polysilicon (column 13, lines 19-36). Accordingly, it would have been obvious to form the conductive movable polysilicon diaphragm and the polysilicon supporter because the conductive polysilicon and the conductive metal are equivalent conductive materials, they both have conductivity characteristics, and they are well known and commonly used for providing the electrical connections. And the substitution of art recognized equivalent is within the level of ordinary skill in the art.

Guo does not show a thin film transistor (TFT) control circuit positioned on the non-single-crystal-silicon-based substrate and electrically connected to the plate capacitor. However, Bhattacharyya (figure 41) shows a thin film transistor (TFT) control circuit 1804 positioned on the substrate and electrically connected to the plate capacitor (MEMs) 1830 for detecting a data signal from the MEMs array and passing such data signal to appropriate logic devices and/or data storage devices (column 46, lines 2-6 and column 42, lines 36-52). It would have been obvious to form a thin film transistor on the based substrate and electrically connected to the plate capacitor of MEMs in order



to send the data signals to or receive the data signals from logic devices and/or data storage devices, as taught by Bhattacharyya (column 46, lines 2-6).

Regarding claims 6 and 11, Guo discloses wherein the stationary electrode (100/524) comprises aluminum (Al) or titanium (Ti) (column 10, lines 29-30).

Regarding claims 3, 5, 17 and 19, Guo does not disclose the TFT control circuit is a low temperature or a high temperature polysilicon TFT control circuit. It would have been obvious to one of ordinary skill in the art at the time of invention was made to apply the TFT control circuit with a low temperature or a high temperature of polysilicon TFT control circuit in Guo, in order to use the capacitive semiconductor device in a particular application.

Regarding claims 7 and 12, Guo (figures 4-5) discloses wherein the diaphragm 122 and the supporter 118 are formed simultaneously (column 6, lines 38-39). It is note that the process limitation (simultaneously) would not carry patentable weight in this claim drawn to a structure, because distinct structure is not necessarily produced. In re Thorpe, 227 USPQ 964 (Fed. Cir. 1985).

8. Claims 2, 4, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (U.S Pat. 6,472,962) in view of Habermehl et al. (U.S Pat.



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6,174,820) and Bhattacharyya (U.S Pat. 6,845,034), as applied to claims 1, 10 above and further in view of Lin et al. (U.S Pat. 6,642,593).

Guo, Habermehl and Bhattacharyya do not show the non-single crystal silicon based substrate is a glass substrate or a quartz substrate.

However, Lin (figure 1h) teaches a substrate 20 can be made of other microwave quality substrate such as a quartz or sapphire substrate (column 2, lines 56-57).

Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form a glass substrate or a quartz substrate in Guo, Habermehl or Bhattacharyya device because as taught by Lin, such substrate is well known and commonly used in the art for the semiconductor substrate.

9. Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guo et al. (U.S Pat. 6,472,962) in view of Habermehl et al. (U.S Pat. 6,174,820) and Bhattacharyya (U.S Pat. 6,845,034), as applied to claim 10 above and further in view of Shrauger (U.S 2003/0020094).

Guo, Habermehl and Bhattacharyya do not disclose the control circuit being electrically connected to the stationary electrode and the diaphragm via the flexible printed circuit board.

However, Shrauger (figure 4) teaches the forming of a plurality electronic components (MEMs) on printed circuit board and being electrically connected to each other. Accordingly, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the control circuit being electrically

connected to the stationary electrode and the diaphragm via the flexible printed circuit board in the above combination device because as taught by Shrauger, such connection arrangements are well known and commonly used for providing the electrical connections between the electronic components.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Theresa T. Doan whose telephone number is (571) 272-1704. The examiner can normally be reached on Monday to Friday from 7:00AM - 4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, WAEL FAHMY can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TD  
April 15, 2005.

  
PHAT X. CAO  
PRIMARY EXAMINER